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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/652,604	08/30/2000	Robert C. Spiro	07078-032001	3029

26181 7590 12/31/2002

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EXAMINER

MAYES, LAURIE A

ART UNIT PAPER NUMBER

1653

DATE MAILED: 12/31/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/652,604

Applicant(s)

SPIRO ET AL.

Examiner

Laurie Mayes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Applicant's election with traverse of Group I, claims 1-6 and 8-17 in Paper No. 8 is acknowledged. The traversal is on the ground(s) that claims 19 and 20 contain the matrix as a primary element and that it would not constitute an undue search burden to search additional growth factors, cDNA gene constructs, hormone or other biologically active substances. This is not found persuasive because groups I and II are directed to compositions encompassing structurally distinct molecules each maintaining a different biological activity. While the inventions are linked by the embodiments set forth in claim 1 and group II would be analyzed if this claim were found allowable. However, the composition taught in claim 1 is not allowable because it is anticipated by the art cited below. For example, Liu et al. (United States Patent No. 5,972,385, 199- IDS reference) teaches compositions and methods of making compositions comprising cross-linked proteins and polysaccharide (see for example claim 1). Liu et al. discuss generating appropriate three dimensional matrix constructs for various in vivo uses, and discuss the addition of other factors such as fibrinogen and collagen as set forth in the instant dependent claims. Because the linking claim is anticipated by the art of record, groups I and II would not be rejoined. In addition, with regard to search burden, a search for a matrix can be used by itself, absent other molecules. Further, each of the additional biologically active molecules represent different types of products drawn to different classes/subclasses each requiring a separate search.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 4-6, 8, 10 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Cook et al. (United States Patent Number 5,916,585). Cook et al. teach a biodegradable (col. 5, line 29) matrix comprised of two layers (col. 5, lines 30-45) comprising a polymeric component consisting of a protein and a polysaccharide wherein the protein is albumin (Example 26, col. 24, lines 35-40) and the polysaccharide is selected from the group consisting of dextran, alginate, hyaluronic acid (claim 7, col. 26, lines 54-59) and heparin (Ex. 24, col. 24, line 19) and the protein is albumin, (Ex. 26), and wherein: said protein and/ or polysaccharide are cross-linked to each other with glutaraldehyde (Example 3, col. 17, lines 35-40); said layers are different in composition from each other (polyethyleneimine and polylysine, Ex. 6, col. 18, lines 35-40); said layers attach to each other through chemical cross-linking (col. 9, lines 43-50); one layer is more porous than the other (Ex. 16, col. 21, lines 57-58) and wherein the matrix contains the growth factor rhBMP-2 (Ex. 16, col. 21, lines 54-57) and other biologically active substances (Ex. 13, col. 21, lines 6-7). Therefore, Cook et al. teach all of the elements of claims 1, 2, 4-6, 8, 10 and 15.

Fig 3! for 2 layers/crosslinking

Claims 1, 2 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Schwartz et al. (United States Patent Number 5,906,997) teach a biodegradable (col. 3, line 55) multilayer (col. 3, lines 48-50) cross-linked (col. 7, lines 53-57) matrix comprised of the polysaccharide

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chitin, chitosan, hyaluronic acid, heparin, heparan sulfate, chondroitin sulfate (col. 6, lines 63-67). Thus, Schwartz et al. teach all the elements of claims 1, 2 and 5.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Hubbell (United States Patent Number 5,573,934). Hubbell et al. teach a polymer comprising layers (col. 16, lines 31-33) comprised of alginate, hyaluronic acid, chondroitin sulfate, dextran, dextran sulfate, heparin, heparin sulfate, chitosan, collagen, albumin in a covalently-bonded, crosslinked polymeric network (col. 12, lines 6-9). Thus, Hubbell et al. teach all the elements of claims 1-5.

Claims 1-6, 8, 10, 11, 13, 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Yannas (United States Patent Number 4,902,289). Yannas teaches a multi-layer matrix comprising two layers comprised of covalent (col. 3, line 26) cross-linked collagen (col. 3, line 9) and where the polysaccharide for both layers is selected from any of the following and need not be identical to each other: chondroitin sulfate, heparan sulfate, dermatan sulfate, keratan sulfate, heparin, hyaluronic acid, or chitosan (claim 3). Yannas teaches that each layer of the matrix is chemically crosslinked by glutaraldehyde to each other (col. 7, lines 15-18) and the porosity of the first layer is less than 10 microns (col. 6, lines 34-35), of the second layer is 50 microns or greater (col. 7, line 29) and where the first layer comprises collagen and elastin cross-linked to each other (Ex. 2, col. 9, lines 55-60). Thus, Yannas teaches all the elements of claims 1-6, 8, 10, 13, 15 and 16. cl. 1 ✓
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Claims 1, 6 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Boyce (United States Patent Number 5,273,900) teaches a cross-linked dermal membrane comprising collagen and chondroitin sulfate (Ex. 1, col. 12, line 47) where said layers are chemically cross-

linked to each other with glutaraldehyde (col. 7, lines 59-62) and also are cross-linked by thermal dehydration (col. 7, line 53). Thus, Boyce teaches all the elements of claims 1, 6 and 18.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 8, 9, 12, 14, 15, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hook et al. (United States Patent Number 4,784,989) and Liu et al. (United States Patent Number 5,972,385) in view of Schwartz et al. Hook et al. teach a cross-linked polymeric component comprising fibrinogen, fibronectin, albumin, collagen or laminin (col. 2, lines 62-65) and dextran or alginate (col. 3, lines 3-5) wherein the crosslinking agent is divinyl sulfone (col. 3, lines 10-15). Liu et al. teach a cross-linked polymeric component comprising hyaluronic acid, chondroitin sulfate, dermatan sulfate, keratan sulfate, heparin, heparan sulfate, dextran, dextran sulfate or alginate and collagen (col. 2, lines 26-31) and/or fibrinogen (col. 2, line 66). Neither Hook et al. nor Liu et al. teach a multi-layered matrix for use in tissue regeneration. Schwartz et al. teach the advantages of using a multi-layered matrix (Schwartz et al., col. 2, line 61) to manipulate the components and ingredients in each layer resulting in each layer exhibiting different properties as desired (Schwartz col. 3, lines 47-50). It would have been obvious to one of ordinary skill in the art at the time of the invention by applicant to add a second layer comprised of the proteins and polysaccharides listed above used by Hook or Liu, of either the same components as the first layer or different components from the lists above

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yielding a second layer of different composition and density, and which is crosslinked with divinyl sulfone, an agent known by Hook to bond these components (col. 3, lines 12), in order to be able to manipulate the components and concentrations of each layer to yield more control and flexibility in the properties exhibited.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laurie Mayes whose telephone number is (703) 605-1208. The examiner can normally be reached on Monday through Friday from 7 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Low can be reached on (703) 305-2923. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3014 for regular communications and (703) 305-3014 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1123.

L. Mayes

Laurie Mayes
Art Unit 1653
December 30, 2002

Christopher S. F. Low
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